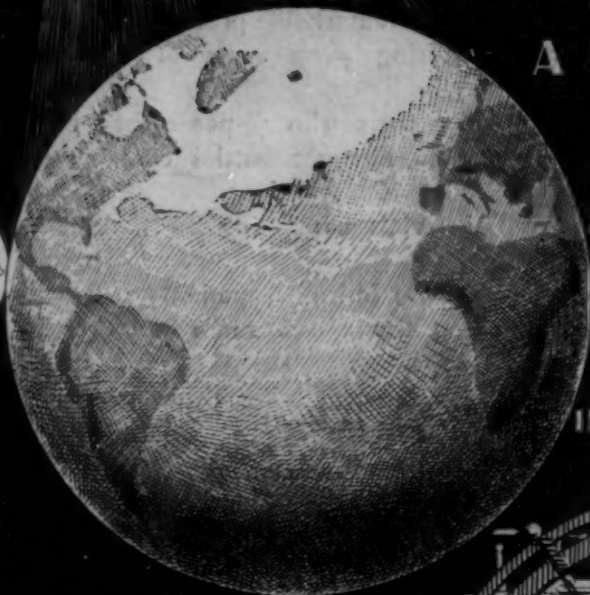


VOL. I. No. 3.

AUGUST, 1897.

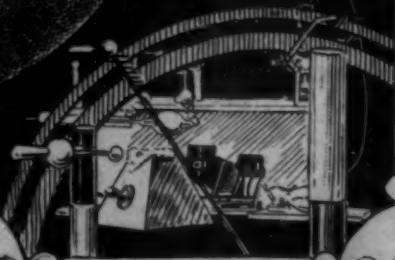
THE AMERICAN

X-RAY JOURNAL



A MONTHLY
DEVOTED
TO THE
PRACTICAL
APPLICATION
OF THE
NEW SCIENCE
AND TO THE
PHYSICAL
IMPROVEMENT
OF MAN.

HEBER ROBERTS, M.D., EDITOR.
2914 MORGAN ST.
ST. LOUIS, MO.



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THE AMERICAN X=RAY JOURNAL.

A Monthly Journal devoted to Practical X-Ray Work
and Allied Arts and Sciences.

VOL. 1.

ST. LOUIS, MO., AUGUST, 1897.

NO. 3.

THE AMERICAN X-RAY JOURNAL.
PUBLISHED MONTHLY.

Yearly Subscription Rates—In Advance.

United States, Canada and Mexico.....	\$1 00
Single copies.....	15
Foreign Countries.....	1 50
Single copies.....	25

HEBER ROBERTS, M. D., EDITOR,
204 MORGAN STREET, ST. LOUIS, MO.

Entered at the postoffice at St. Louis, Mo., as second-class matter.

Particular attention is directed to the laborious and exhaustive report made for this journal by Dr. N. Stone Scott, which covers the study of "x-ray injury," and deserves the closest attention. It is the only catalogue raisonne made of this irritating subject by an impartial, ardent investigator.

I desire to supplement briefly what has been here said, quoting from three eminent men, and also from my own experience.

Nikola Tesla says, in the Electrical Review: "It was known to me that a certain irritation of the skin is caused by very strong streamers* which mostly at small distances are formed on the body of a person through the electrostatic influence of a terminal of alternating high potential." Tesla discovered that by the interposition of substances capable of conducting an electric current, as aluminum, or a substance occluding the skin from air, as oil, both of which are readily pervious to the x-rays, would shield the body from injury. He further says: "These facts impressed me with the conviction that, whatever

the nature of the hurtful influence, it was in large measure dependent either on an electrostatic action or electrification, or secondary effects resulting therefrom, such as are attended to the formation of streamers." Tesla tested the action of the x-rays upon the skin by placing three bone buttons on the body. The x-rays are propagated in straight lines, and it was impossible for the rays to have reached the skin through the openings in the buttons. At this point, however, the skin was injured. Tesla says: "Concomitant causes were at least in part responsible."

Assuming that the x-rays may cause injury to the skin, Prof. Tesla concludes with four "specific actions:"

First. The thermal effects. Considering velocity of x-ray particles, they correspond to temperature which may be as high as 100,000 degrees, Centigrade. These particles with such intensity of heat would be injurious to the elements of life.

Second. There is the purely electrical effect, x-rays conveying electricity, and the amount can be measured. These bodies being highly electrified, coming in contact with the body, may destroy the tissues.

The *third* effect is the electro-chemical. The charged bodies giving rise to an abundant generation of ozone, which is a destructive agent to the skin.

The *fourth* is the purely mechanical. By mechanical means alone bodies moving with great speed might be sufficient

* Not x-rays.—ED.

to deteriorate the tissues, and, of course, deeper layers then would be influenced.

Carl Beck, M. D., Professor of Surgery in the New York School of Clinical Medicine, one of the largest users of the x-rays in the world, having daily occasion to use it in his abundant surgical clinics, makes use of this language in his "Roentgen Rays in Surgery," read before the Pan-American Congress in the City of Mexico, Nov. 9, 1896: "Although having made more than 300 skiagrams since February, 1896, and knowing of many others, I have never observed any ill effect that could be traced to the rays. I once exposed myself to the rays for more than five successive hours, and did not note the slightest reaction."

Dr. W. J. Morton, of the New York Polyclinic, and the most widely known x-ray expert in America, author of "The X-Rays, or Photography of the Invisible," etc., writes in the Items of Interest: "Never in my experience, and I have continuously taken x-ray pictures of every sort since the first announcement, more than a year ago, have I seen the slightest injury to a tissue result. This I believe to be due to the fact that I have used a powerful x-ray, and have thus been enabled to place my Crooke's tube at a considerable distance from the patient." Beyond the hurtful influence of electric streamers, of course.

I have continuously made use of the x-rays since July, 1896, and have in no instance observed the slightest inconvenience. In order that the so-called x-ray dermatitis or destruction of tissue might be imitated by another method, but caused by the same conditions, I united in a chain or string of cotton twelve Grecian sponges. The first sponge was united to a No. 32 wire six feet long, the other end of which was hooked into an exposed electrode of a Crooke's tube incapable of generating x-rays. The current of electricity

divided, just as it would do in a live tube, and passed with considerable resistance to the twelfth sponge, which by the aid of an insulator I was able to brush over and very near to the thigh of a paralytic. After a time the sensation was perceptible, which resulted in a dermatitis. The experiment was repeated with a live tube, with similar result. If this wire is coiled about the glass tube it will manifest the same result. If the skin is exposed to any point of the wire connecting the stand with the Crooke's tube, the result is the same. If the skin is exposed to the tube while an electric current passes, the effect will be the same, and it is not modified by the direction of the reflector. Any substance capable of shielding the body from these electric streamers, but pervious to the x-rays, not interfering with their free passage through the body in the least, immunes the body from all injury, and provides a reason for the conclusion that the x-rays have no hurtful properties.

I exposed a feeble child five years of age to the x-rays 45 minutes, distance from the discharge tube 16 inches. The current was the high frequency amplified from the alternating incandescent street current. In the months of December and January nearly 600 eyes, representing every nature of disease and cause of blindness, were exposed to the x-rays. No ill effect was noted in any case, and many were exposed at 6 inches for 10 minutes. Exposure was made to powerful x-rays of women in the first, second and third months of fetation. The rays penetrated the pelvis twenty minutes duration at 12 inch distance, the subjects objecting to longer exposure, without any noticeable effect. Maternity was normal in each case. A hen laying eggs was exposed to the x-rays on several occasions of 15 minutes at 6 inches. Exposures were made at night when the hen was quiet. A setting was

made of nine of these eggs. During the period of incubation the hen and nest were exposed to the rays at a distance of 6 inches from the tube and 15 minutes duration. All the eggs hatched and the chicks appeared normal.

With all that has been written for the lay press, medical journals and scientific publications, I am unable to find a rational conclusion for the belief that the x-rays ever injured in any instance human tissue. A doubt lingers around every report, speculation pervades the mind of nearly every writer, or sensation titillates the ambition for place in the press of erstwhile investigators.

X-RAY INJURIES.

BY N. STONE SCOTT, A.M., M.D., CLEVELAND, OHIO.

Consulting Surgeon to the City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Out-Patient Department, Cleveland General Hospital, Etc.

The question of x-ray injuries is of so much importance that it has excited great interest, and has received extensive notice in the medical, electrical and lay press. As regards the medical press this is especially true of a case reported by a physician, who, without x-ray experience, has relied on his medical knowledge alone, and has advanced an erroneous theory of the first importance.

It has been evident for a year past that the x-rays are sufficiently powerful to produce under some conditions most disastrous results, but very diverse views have been held as to the cause, the frequency, the kind of apparatus most likely to produce them, and the best way to avoid them.

In order to assist in arriving at a proper solution of these questions, I have sent a circular to most of the leading medical and electrical men who are doing x-ray work, asking for particulars of x-ray injuries. The questions asked include the kind of apparatus, length of

spark, number of exposures, distance of platinum from the part exposed, and inquiries relating to the characteristics of the injury itself. The results of these investigations are shown on the accompanying chart. Some fifty personal replies have been received; one quarter of these report forty-five hundred cases, and, since a large number of the leading men in x-ray work are to be found among the writers of the three-quarters giving no estimate of the number of cases examined, it is certainly not an over-estimate to say that this report includes at least twenty thousand examinations, exclusive of those made by x-ray exhibitors. This list contains thirty-one cases of injury, or one in about thirteen hundred.

Dr. Gilchrist, of the John Hopkins Hospital, has collated from the literature twenty-four cases of injury. I have, mainly by personal letters, increased this to sixty-nine. This includes the case of J. Lynn Thomas, of cystitis, which the author thinks was not due to x-rays; one reported by Dr. Wallace, in which she attributes an aggravation of renal colic to the action of x-rays; and one reported by Prof. Blake, in which there was the formation of abscess, evidently due, as the Professor thinks, to an increase of the original difficulty. It includes a similar case of my own, of a felon, which I think an incident rather than a result of the x-ray examination. The chart also shows twenty-three cases listed as x-ray exhibitors, as well as several cases in which the injury was doubtless an increase of the trouble for which the case was examined, rather than an x-ray injury.

Many of the reported injuries occurred in the early days of the discovery, when the apparatus was crude or the operator inexperienced. It is not difficult in most of the severe cases to see how it might have been avoided.

The symptoms of all cases, except the

few where deeper structures were supposed to have been affected, present the picture of a dermatitis, the distinctive feature of which is its slow onset and tendency to assume a chronic form. Those who work extensively with x-rays are frequently compelled to give up their work. The first symptoms appear as a rule, in from three to seven days. Fuchs, however, reports a case of one exposure of an hour, in which the hand had a frozen appearance during the exposure, with pain, redness and swelling, which commenced at once continuing to vesication. Profs. Daniels, Marcuse, Kolle, J. Mont Bleyer and others, mention cases which were several weeks in developing symptoms that were noticeable.

The skin directly over that strongest source of x-rays, the platinum terminal, first commences to swell, becoming red and painful; this gradually extends to parts farther from the source of x-rays, even to those parts not directly exposed. The pain is of a deep-seated, dull, aching character (although some cases run their course without pain). Vesicles then appear filled at first with a serous exudate and purulent material; in severe cases a sphacelus forms which is gradually thrown off, leaving a raw granulating surface slow to develop and slow to heal.

The kind of apparatus seems to make no difference; the Ruhmkorff coil, the Tesla coil, and the static machine have all given severe cases. The majority have been given by the Ruhmkorff coil; but this is due simply to the fact that this was the kind first in use, and is yet by far the most frequently used.

Distance of the platinum terminal is of importance, because when the platinum is near, the x-ray is concentrated upon a small surface; but if the ray is strong enough to produce desired effects, it will be strong enough to produce the undesired if continued too long. Kolle

and Richardson both report cases where the platinum was eighteen inches away; Richardson's case being submitted to three examinations (on successive days) of twenty, thirty and thirty-five minutes, a total of only eighty-five minutes.

The length of time is also important. On the chart five cases are reported from exposures of less than one hour. In cases No. 1 and No. 57 the distance of the terminal is not given; the time is forty-five minutes. No. 21, which is exactly one hour exposure, with quite severe symptoms, had the terminal at only five inches. Number 41, though extremely short in time, only five minutes each on three successive days, was only one inch from the terminal. If the experiment had been made at a distance of eight inches this would have been equivalent to some five hours exposure; not so very short a time after all. It seems probable that the most susceptible would not be affected by an exposure lasting an hour if the terminal is at least ten inches away; this, under all ordinary circumstances, is amply sufficient for a medical examination.

Consideration of the causes of x-ray injuries would take us too far beyond the scope of this paper, and belongs legitimately to the electricians, who are at wide variance with one another. I shall only mention in passing the various theories. Elihu Thompson advanced the theory that the burns were caused by ultra violet light; he has since proved to his own satisfaction, although not to the satisfaction of some others, the falsity of this hypothesis. Tesla considers the injury due to ozone generated at the point of contact of the x-ray. Another believes it to be nitrous acid. Several experimenters think it is produced by particles bombarded off the terminal. One observer believes the particles floating in the air are bombarded into the skin by the x-ray. A number of operators have advanced the

theory that the burns are caused by static or other electrical discharge. It seems certain that if it be not due to the x-rays directly, it must be something which goes where they go, and any thing which would protect would stop the ray, since cases of injury have occurred through clothing of various kinds and through many protective substances, such as vaseline, zinc ointment, thin aluminum, etc.

That the x-rays do affect the skin, seems certain, but that deeper structures are affected primarily, is at least doubtful. Among the reported cases there are but six which can possibly be so classed.

Dr. A. G. Wallace, in the *Kansas Medical Journal*, February, 1897, reports a case of renal colic, which prior to the x-ray examination had been having attacks about once a month; after the x-rays were used these occurred every day and a large quantity of sand was passed. This "disintegration of the calculus" the doctor attributes to the x-ray. There have been many cases of renal calculi examined by x-rays, and, since this case is the only one in which such a result has been noticed, it seems much more probable that this increase was a coincidence rather than a result.

Dr. J. Lynn Thomas, in the *British Medical Journal*, March, 1897, reports a case of stone in the bladder, which the day following an exposure to the x-rays lasting sixty-five minutes, developed a cystitis. Dr. Thomas does not think the x-ray caused the cystitis; a conclusion which seems eminently proper, in view of the fact that a bladder with a stone in it is sure, sooner or later, to develop cystitis; yet it may be possible that the irritation of the stone, while not enough to produce symptoms of its own, may have been enough so that the slight added irritation of the x-ray brought on the cystitis. The case is certainly of great interest, and worthy of record.

The *Electrical Journal*, December 1, 1896, contains an account of a case in which Prof. Blake examined the ankle by x-rays; six weeks later an abscess opened in the region of the ankle joint. Prof. Blake in a personal communication to me says that he thinks the abscess due to the original trouble for which the examination was made.

This leaves three cases in which there is a reasonable doubt as to the existence of a periostitis. One was reported to me by my friend, Dr. B. Of this case the doctor says: "The periostitis which resulted from the x-ray examination delayed an operation which was necessary for an old dislocation of the ulna, and the exudate which was thrown out tended to interfere with a better result." That this bad effect was due to the x-ray is at least doubtful. Hundreds of examinations have been made for fractures and dislocations without producing such results. On the other hand, medical history is replete with cases of comparatively trivial fractures and dislocations which later developed periostitis. Thus it certainly is not proven that the x-ray was an etiological factor in the production of the periostitis.

My own case was that of a quadroon, twenty-eight years old, who had her hand severely crushed and burned five years before in the hot mangle of a laundry. As a result of this there was extensive sloughing of the soft parts, and consequent cicatricial contraction when the hand finally healed. December 18, 1896, the hand was viewed several times in the fluoroscope, and two skiagraphs were taken. The apparatus consisted of a Tesla coil and double focus tube, made by the Warren Tube Works after my own drawings. The hand was placed eight inches from the platinum terminal, the exposures lasting one and a half minutes each. January 14, 1897, almost a month after the examination, she presented herself with an inflammation of

the distal phalanx of the middle finger. The pain, she said, started at the time the examination was made, and had been very severe until some days since, when an abscess broke between this finger and the next, to which it was closely bound. From this time on the pain was comparatively slight, lasting for a number of weeks, until, finally, a small sequestrum was discharged, after which it healed rapidly. At no time did I see any inflammation of the skin. There was undoubtedly in this case an osteitis and accompanying periostitis, that this developed soon after an x-ray exposure is equally true, and it is impossible to prove that the inflammation was not due to the x-ray. It has to be borne in mind, however, that these cases of scar tissue and consequent lowered vitality are especially prone to inflammatory reaction; and some other accident, possibly slight, which she either unconsciously or wilfully overlooked, might easily have been the determining cause.

The case of Dr. Gilchrist I have reserved to the last, because of its importance, of the wide publicity given it, and because of the harm done by the erroneous deduction which the doctor has drawn. In the beginning of the x-ray work, many physicists, because they were in a position to manipulate a Crookes tube, undertook to pass judgment upon medical subjects. Much wild semi-medical talk and writing was indulged in, and not a little harm done, so that the profession was not slow to see that medical men must equip themselves to retain control of medical subjects. As an illustration I would cite a little book entitled "Something About X-Rays for Everybody," by Edward Trevert, Electrician. On page 61 he says: "Figure 38 shows the bones of a young woman's arm, consisting of the humerus (upper bone), the hinge joint of the elbow, and the ulna and radius (the lower bones). A fracture of the

radius near the elbow is distinctly shown." This fracture, which is so distinctly shown, is nothing else than the bicipital tuberosity. Such mistakes were very natural, and arose from a lack of medical experience and knowledge. But a medical knowledge is not the only requisite, and Dr. Gilchrist, who is not an x-ray operator, has made a very natural mistake on the other side, and given a wrong interpretation to his skiagraphs when he infers that there is an osteoplastic periostitis present. The case was, briefly, that of an x-ray exhibitor, who, after exposing his hand four hours daily for three weeks, had a dermatitis develop over the hand, wrist and forearm. The points on which the doctor relies for a diagnosis of "osteoplastic periostitis, and probably an osteitis," are:

1st. Pain which was of an aching, throbbing character, so that he frequently could not sleep at night.

2d. The phalanges were noticed to be distinctly thickened.

3d. Voluntary movements of both fingers and hand were abolished; he complained of the joints being very stiff.

4th. Photographs show all the phalanges of the right hand much thicker than those of the left, normal hand. The increase in size is particularly marked in the first phalanges of the index and second fingers. It cannot be said from the photographs, alone, that any of the carpal bones were increased in size.

5th. The spaces between the bones at the joints were much less marked and narrower than those of the normal hand.

6th. The outlines of the affected bone was more irregular and rougher.

7th. The bones were denser in appearance.

Let us review his reasons and, if possible, answer them:

1st. Pain of a dull, aching, throbbing character, might suggest bone pain, but it is also characteristic of most x-ray burns, even those on the thigh and ab-

domen, where it cannot be due to injury of underlying bones.

2d. The sensation of the phalanges being thickened, might be due to a thickening of the bone, but, if the skin is thickened and infiltrated, it would be very easy to imagine that the bones were thickened. A comparison between the diseased and normal finger by the sense of touch would be most deceptive.

3d. The feeling of stiff joints and loss of voluntary movements would certainly be the result in a severe dermatitis with infiltration of the deeper portion of the skin, and, furthermore, if the bones involving the finger joints had been involved and the carpal bones not—as judging from the skiagraphs is the case—the fingers ought to be stiff, the wrist movable. The history distinctly says, however, that the wrist was stiff.

4th. When one views the hand through a fluoroscope, and has the strength of the x-ray gradually increased, the first thing seen will be an outline of the hand, then gradually the bones become clearer, and after a little the thinner parts of the flesh gradually fade out, as it were, and, lastly, even the bones seem to dissolve, commencing at the thinner and smaller ones. So, too, if one takes a skiagraph of the hand, and gives sufficient time to properly bring out the wrist and thicker parts, the thin parts will be overtired. It was while conducting a series of experiments some time since, to overcome the unequal exposure, that I got some pictures of normal hands, which offer an explanation and refutation of the fourth, fifth, sixth and seventh points made by Dr. Gilchrist. These pictures were made by shading the thinner parts, during part of the exposure, with lead plates. Apparently the infiltration of the skin and its consequent thickening has brought about the same result that the lead plate produced with a normal hand.

5th. In the under-exposed hand the

joints are much less marked and narrower than in the one over-exposed.

6th. The under-exposure is also the cause of the affected bones being more irregular and rougher, because in the over-exposed bone the lesser projections and irregularities are first to disappear, thus diminishing the apparent size and smoothing off the outline.

7th. The same reason accounts for the apparent density of the bones.

8th. Aside from these points, an examination of the outlines of the soft parts shows that those of the affected hand are plainer than those in the other, adding to the proof that the affected hand is relatively under-exposed. And last, but not least, I must criticise any deductions drawn from a comparison between one picture of each hand on the assumption that they are taken under similar circumstances. One cannot be sure that a tube is working just the same during two exposures, and since we have no standard of measure for x-rays, it is impossible to say that the relative exposure is the same. This case of Dr. Gilchrist's should have had a series of pictures taken of each hand.

In conclusion I would recapitulate:

1st. Injuries are very rare when proper precautions are taken.

2d. Injuries are limited to the skin and contiguous structures, at least it is not proven that deeper parts are injuriously affected.

3d. It is probable that the bones or deeper structures are not affected.

4th. The proper precautions consist in confining x-ray examinations to short exposures, not to exceed one hour for a distance of ten inches from the terminal, and not to be repeated until sufficient time has elapsed to show that no bad effects seem likely to develop.

5th. If repeated short exposures are made, the slightest bad symptoms should be an indication to cease all farther exposures.

X-RAY INJURIES. N. STONE SCOTT, M. D.

No	NAME.	REPORTED BY	WHERE REPORTED.	APPARATUS USED.	LENGTH OF SPARK.	DISTANCE FROM PLATE TO REFLECTOR.	EXPOSURES. No. Length.	DATE, Time of Development.	PART EXPOSED.	DURATION OF SYMPTOMS.	SYMPTOMS.	REMOTE RESULTS.	REMARKS.
1	P.	Dr. B.	Personal.	28 Ruhmkorff.			1 45 min.	Mar. 15, '97. 3 Weeks.	Left Thigh.	Ulcer, 3"x6" 2 mos. after.	Blebs followed by Dermatitis Ulcer, 6"x8"	Epidermization.	Progressing Slowly.
2	G. W. M.	Dr. W. E. Parker New Orleans.	New Orleans Med. and Surg. Jour. p. 156, Sep. '96.				July 1-20 mi. " 3-40 " " 4-40 " " 6-60 " " 9-90 "	July 4, Swollen and Red. July 7, Swollen and Red. 2 1/2 Weeks.	Left Inferior Maxilla.	2 1/2 Weeks.	Swollen and Red. Peeling of Epidermis.	Hair on Left Side of Face no longer grows.	Bullet subsequently Located.
3	C. Smith.	Mr. Green.	Personal.	7-in. Coil Experiment'l Tube.	6"	8"	3 1 hour each.	Dec. 18, 19, 20, '96. 10 Days.	Head.	3 Months.	Appearance of Seal—Loss of Hair.	Thoroughly Recovered, Hair Returned.	Since using short exposure with Static Machine—No bad results.
4	Elihu Thompson.	Elihu Thompson.	Personal.	Static Machine, Single Focus Tube.	4"	11"	1 30 min.	9 Days.	Little Finger of Left Hand.	7 Weeks.	Dermatitis Ulceration.	Scar.	
5	Elihu Thompson.	Elihu Thompson.	Personal.	Static Machine, Single Focus Tube.		5"	1 12 min.	11 Days.	Third Finger of Left Hand.	3 Weeks.	Dermatitis.		No effect through lead and tin foil. Effect through Al'm in and on exposed surface Occurred in Edison's Laboratory.
6		Elihu Thompson.	Boston Medical and Surgical Journal Dec. '96.								Severe.		Had to Stop Work.
7		Elihu Thompson.									Severe.		Owing to arms being affected through clothing.
8	Tube Tester.	Elihu Thompson.							Hands.				Letter implies he worked with X Ray.
9	H.	Mr. T.	Personal.	22									
10	Jno. McA.W.	Capt. W. B. Banister.	Medical Record, Jan. 25, '97.	45			3 1 1/2 hours ea. 8 Total, 12 hrs.	Aug. 11 and 12, '96. Sept. 9, 10, 11, 12.	Abdomen		Aug. 11 and 12, Slight Redness signs on Sept. 9. Gradually increase—Dermatitis and Ulceration—10"x8"	Lost Hair on Face and Hands—Change color at 6 mos. Ulcer, 5"x3"	
11	Dr. A. D. Rockwell.	Dr. A. D. Rockwell.	Medical Record, Apr. 24, '97.	Static Machine.			Frequent Short.	March '97. Burning and itching following exposure.	Left Hand.		Dermatitis with Exfoliation.		Not entirely well 6 weeks after—Pain deep seated—Hot.
12	N.	Dr. H.	Personal.	Edison 4" Coil.		6"	100 a day for 2 weeks. 3 a day for 2 weeks.	Nov. 20, '96. 2 Weeks.	Left Hand.	5 Weeks.	Dermatitis Pains and Swelling.		Roughness and Slight Lack of Nutrition.

No injury.

Take burn—more.

2 Months.

Breast.

4 Days.

2 Weeks.

12"

2 30 min. each.

3"

Ruhmkorff Coil.

Personal.

Prof. C.

H.

13

13	H.	Prof. C.	Personal.	Ruhmkorff Coil.	12"	3"	2	30 min. each.	4 Days.	Breast.	2 Months.	Lake burn persistent.	No injury.
14		Prof. C.	Personal.	Ruhmkorff Coil.			1	5 min.		Wrist.	2 Weeks.	Slight burn.	
15	Dr. G. C. Skinner	Dr. G. C. Skinner	Personal.	Tesla Coil.	9"	4"	3	20 min. each.	Sep. 20-27, '96, 10 Days.	Wrist.	3½ months.	Dermatitis with Ulceration.	Implication of Tendons from Inflammation.
16		Dr. G. C. Skinner	Personal.	Tesla Coil.						Abdom'n		Dermatitis with Ulceration.	
17	P.	Prof. H.	Personal.	Tesla Coil, Double Focus Tube.	8"	6"	1	20 min.	July 2, '96, 2 hrs.	Knee.	Several Weeks.	Spot 2½" diam. like steam burn.	Inflamed and painful before exposure.
18		Mr. S.	Personal.				1	20 min.		Thigh.		Burn.	
19		Mr. S.	Personal.				1	30 min.		Thigh.		Burn.	
20	M.	Prof. M.	Personal.	Ruhmkorff 10" Focus Tube.	10"	3", 12"		Various short for 4 days.	Sept. 15, '96, Week or more	Left Hand.	2 Weeks.	Dermatitis like Ivy poison.	None.
21	S.	Dr. B.	Personal.	Ruhmkorff Coil.	8"	8"	2	30 min. each.	Sept. '96, 10 Days.	Arm and Hand.	2 ½ Weeks.	Symptoms of Periosisitis.	Inflammation delays operation for dislocated Ulna, Interferes by better results.
22	J.	Mr. J.	Personal.	Ruhmkorff Coil, Single Focus Tube.	7"	4", 20"		1-4 hours daily for two weeks.	July, '96.	Hand and Face	5 Weeks.	Like Ivy poison suppuration.	Scar. Loss of Beard, more scanty and of different color.
23	H.	Dr. K.	Personal.	Ruhmkorff Coil.		6"	3	1½ hrs. each.	Dec. 12, '96, 3 Weeks.	Abdom'n	Several Weeks.	Dermatitis and Ulceration.	Cloth over skin.
24	G.	Dr. K.	Personal.			6"	3	1½ hrs. each.	Jan. 31, '97, 4 Weeks.	Left Hip.		Dermatitis and Ulceration.	Used vaseline freely at each exposure.
25		Dr. J. C. White.	Boston Med. and Surg. Journal, Dec. '96.				2	30 min. 45 min. following day.	July, '96, Day after 2d exposure.	Sternum.	Nov. 15, two spots unhealed.	Dermatitis and Ulceration.	
26	G. S. Newcomb.	G. S. Newcomb.	Mod. Med. Science, Nov. '96.							Hand.		Dermatitis and Ulceration.	Had to renounce further investigation.
27		Dr. W. V. Gage.	Medical Record							Body.		Dermatitis and Ulceration.	
28		H. C. Drury.	Brit. Med. Nov. 7, '96.				2	1 hour, 1½ hr 6 days lat r.	Nausea after each exposure. Derm. 2d, after 2d exposure.	Abdom'n		Nausea, Dermatitis and Ulceration, 7½" x 8½".	Symptoms of Renal Calculus.
29	Prof. Reid.	G. E. Armstrong.	Montreal Med. Jour., Apr. '97.	10" Spark Focus Tube		3"	4	20 and 40 mi. 50 " 50 "	Nov. 2, " 3, " 5.	Abdom'n and Chest.	33 Days.	Dermatitis and Ulceration.	Waistcoat lined with scarlet flannel.
30		Dr. E. H. Lee	Jour. Amer. Med. Assn., Jan. 16, '97.				1 or 2 a wk. for 4 wks.	3, 1 hour.	After three exposures.	Head.		Dermatitis and Ulceration.	Eye closed during exposure but has granulated surface of conjunctiva.

No.	Miscellaneous	Prof. Blake.	Electrical Journal, Dec. 1, '96.							Few Days	Foot.	after abscess.	Disease. Reporter thinks not due to X-ray.	
49	E. C. A.	Dr. A. Forster.	Deutsche Med. Woche, Feb. '97.	30				10 cm	1	25 min.	Jan. 1 5 Days.	Head.	Dermatitis. Loss of Hair.	
50	C. B. E.	Dr. A. Forster.	Deutsche Med. Woche, Feb. '97.	40					2 3	15 min. each. 30 min. each.	Dec. 8, 2 days " 15, " "	Head.	Slight Red- ness. Dermati- tis. Loss of Hair.	
51	Prof. Wilson	Caffrey & Wilson.	Electrical World, Jan. 9, '97.						2	3 hrs. each. 2 days.	Sept. '96	Fingers, Left Hand.	Dermatitis and Ulceration.	
52	T.		Personal.	50	Induction Coil. 5" Spark.	10"	3" 4"		2	1 and 2 hrs.	Several days	Abdom'n	Dermatitis and Ulceration. Still confined to house after 10 months.	
53	O. Leppin.	O. Leppin.	Deutsche Med. Woche, July 9, '96.							Frequently for many days.		Left Hand and Fingers.	Dermatitis with vesicles. After 5 weeks hand still looked older than the other.	
54		Dr. Feilchenfeld	Deutsche Med. Woche, July 23, '96.					Exhibited		case similar	to Dr. Mar- cuse's.	No details	given.	
55	Photo- grapher,	Dr. Conrad.	Codex Medicus, Aug. '96.							Frequently and for some time.		1st & 2d Fingers Left Hand.	Dermatitis— Slight.	
56		Schrawole.	Deutsche Med. Woche, Oct. 8, '96.						1	55 min.	2 Weeks.	Abdom'n	Dermatitis and Ulceration.	
57	J. MacIntyre	J. MacIntyre	Nature, Nov. 15, '96.	35										Thinks electri- city chief cause.
58		M. S. Stern.	Am. Med. and Surg. Bulletin, Nov. 21, '96.						3	40-50 min. each.	2 Days.	Chest.	Dermatitis. face to umbilicus, and Ulceration.	
59		Dr M. H. Richardson.	Med. News, Dec. 26, '96.					18"	3	20-30-35 min. each.	2 Days.	Abdom'n	Dermatitis and Ulceration.	
60		Univ. of Minn.	Med. Record, Dec. 15, '96.						1	Several hours.		Ear.	Hair lost surrounding Ear.	
61	X-Ray Exhibitor.	Dr. T.C. Gilchrist	Johns Hop- kins Hosp. Bulletin, Feb. '97.							Frequent.		Hands.	Dermatitis with Exfoliation.	
62		Dr. W. Downe.	Lancet, '96, ii 1049.								10 Days.	Neck and Scalp.	Dermatitis. Vesication and Loss of Hair.	
63		Dr. Sewell.	Lancet, '96, ii 1049.					Reported similar						
64		Dr. M. Rendy.	New York Med. Jour., Feb. 29, '97.						1	55 min.	Erythema soon after.	Chest.	Dermatitis and Ulceration.	

	Dr. B.	Personal.	40	Ruhmkorf with break.	10", 16"	10", 20"	1	15-30 min.	May '96 14 Days.	Chest.	10 Days.	Burning Pains.	Thinks cause floating particles propelled into skin.
65	Dr. B.	Personal.	40	Ruhmkorf with break.	10", 16"	10", 20"	1	15-30 min.	May '96 14 Days.	Chest.	10 Days.	Burning Pains.	Thinks cause floating particles propelled into skin.
66	Dr. B.	Personal.	31			10", 20"	1	15-30 min.	Nov. '96 7 Days.	Back.	10 Days.	Burning Pains.	
67	Dr. B.	Personal.	37			10", 20"	1	15-30 min.	Dec. '96 10 Days.	Back.	10 Days.	Burning Pains.	
68	Dr. C.	Personal.											
69	Dr. N. Stone Scott.		28	Tesla Coil Double Focus Tube.		8"	2	1/2 min. each	Dec. '96 soon after.	Hand (in'gld)	Several Weeks.	Felon No Dermatitis.	Probably not due to exposure

X-RAYS AS A DEPILATORY.

Dr. Freund, of Vienna, has used the x-rays as a depilatory. The experimenter tried them upon a boy whose spine was hidden by an abundant crop of hair. This malady is known to the profession as hypertrichosis. Dr. Freund turned the x-rays upon the boy's back and the superfluous hair roots and all, vanished. The boy had been shown to the medical society in Vienna, and photographs of his condition before and after the application of the x-rays taken, which confirm the success of the application. The permanency of the cure may be questioned, as similar experiments in this country have shown that after the removal of hair by x-rays the follicles after a time appear to be stimulated and the hair then grows more vigorously than before.—*Magazine of Medicine.*

Dr. Freund can run the same electric current through a tube which is dead, or will not generate x-rays, and obtain precisely the same results. The x-rays had nothing to do with the removal of the hair.

RADIOGRAPH OF AN ADULT.

We are under obligations to Dr. Wm. J. Morton, of the New York Polyclinic, for courtesies extended in securing this half-tone, and to Joseph Wetzler, editor of the *Electrical Engineer*, in which paper the picture first appeared, and who kindly reduced the plate for reproduction in the *AMERICAN X-RAY JOURNAL*.

The radiograph is of a healthy, well muscled woman 30 years of age, 5 feet and 4 inches high, and weighing 120 pounds. Tube was $4\frac{1}{2}$ feet from the body, and active 30 minutes. It is the first x-ray picture of the entire body of an adult. The picture is under-exposed. The x-rays were evidently very powerful, because, if the intensity diminishes inversely as the square of the distance, it would take about twenty times as long

to take a picture $4\frac{1}{2}$ feet from the sensitive plate as it would one foot. Due to the casting of long shadows, distorting the picture, the tube was required to be placed $4\frac{1}{2}$ feet above the stomach. Dr. Morton had made attempts to radiograph the entire body with 2 and 3 discharge tubes working at the same time, but independent pictures, and unequal power of the discharge, necessitated failure. This shadow-graph shows not only the bones and skeleton, but also the flesh and the texture of the clothes worn. The silk folds of the sleeves are mainly visible to the naked eye, as well as the folds of the skirt and its hem. The gold necklace about the neck, the bracelet on the arm and the finger rings on the hands may be noted. Some of the rings contained diamonds, in which case the rings appear to be stoneless, as the diamond is a carbon and not opaque enough to be affected by the rays. The garter buckles appear clearly, the one on the right being more visible than the one on the left, which shows directly over the knee bone. The high-laced patent leather shoes show the eyelets and the nails in the heels. The portions of the internal anatomy showing the heart, liver and stomach.



ALCENGA, N.Y.

RADIOGRAPH IN DENTISTRY.

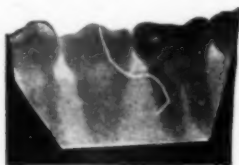
By C. EDMUND KELLS, JR., New Orleans, La.

The illustrations herewith demonstrate the great value of skiagraphy in dentistry, in one class of cases only.



The cast of lower teeth upon the right side of a young girl about 14 years of age, shows a tooth occupying the place of the second bicuspid, to be abnormal in shape, resembling greatly a temporary molar, and the question arises as to whether it is only a temporary molar, or permanent bicuspid.

In this individual case, which was shown to a number of prominent and well-informed dentists, opinions were divided, some pronouncing it a temporary molar, which should be extracted, others a permanent tooth which should not be disturbed.



Now if it were a temporary tooth, it would have bifurcated roots, if a permanent tooth, a single one.

The skiagraph shows but one root, and so settles the question beyond dispute.

This is but one instance in which the use of the Roentgen ray is most valuable in dentistry.

SKIAGRAPH OF FRACTURE OF TIBIA AND FIBULA.

By DR. JOHN T. PITKIN, Buffalo, N. Y.

On August 15th, 1896, the gentleman whose foot appears in the accompanying half tone, while riding on his bicycle homeward bound from business, was struck by a passing vehicle, dismounting him with great violence.

By the impaction of his right ankle against the street curbstone, he sustained a fracture of tibia at its lower third, and two fractures of fibula, one at upper, the other at its lower extremity. So great was the resulting loss of bone support that the foot could be flexed or extended, everted or inverted on the leg ad libitum.

For six days subsequent to foregoing traumatism the fractured bones were sustained by loosely applied splints, to allow the acute inflammatory action to subside. At the expiration of that period plaster of paris bandages were substituted, and worn for a period of about one month, statu quo. The limb now is, as revealed by skiagraphy, as follows: The tibia has reunited with osseous union, but its lower third has been allowed to rotate forward about forty-five degrees, the internal maleolus rests anteriorly upon the superior articular surface of astragalus, forcing the same away from the corresponding articular surface of tibia.

The upper peroneal fracture has healed properly, but the lower third presents a cartilaginous union, as shown by vertical line in skiagraph. Thus the ankle is left with but little lateral bony support, and therefore requires the constant employment of metallic braces.

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One High Frequency X-Ray Apparatus, complete. Does beautiful work. Cost \$225.00. Will sell for \$100.00 cash. Reason for selling going out of the country. Address

AM. X-RAY JOURNAL

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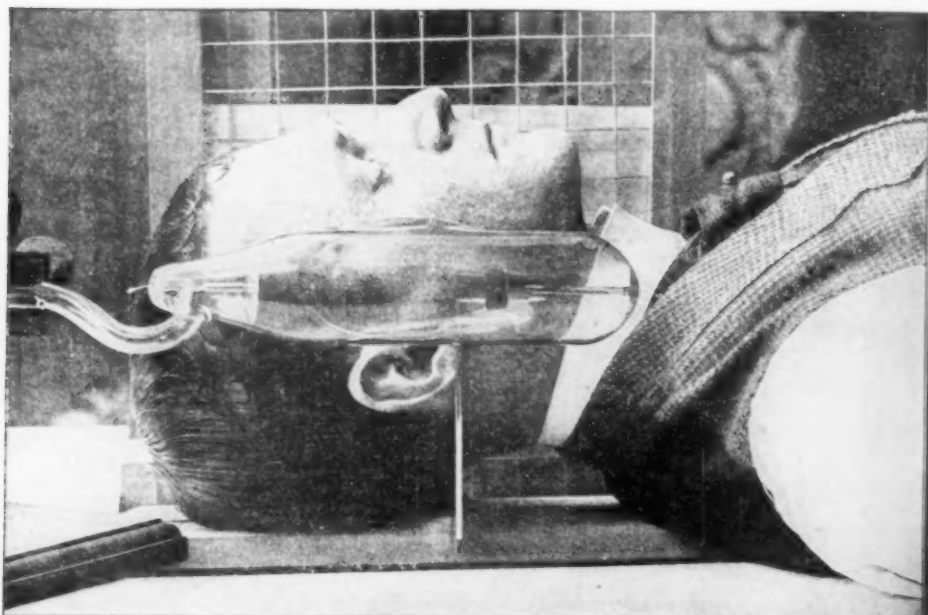
Every one who cares for children, and who does not, will be interested to know that another volume is about to be added to our rapidly growing pediatric literature. The Medical Gazette Publishing Co. announces a book "About Children," to be issued in September. It is written by Dr. Samuel W. Kelley, Professor of diseases of children in the Cleveland College of Physicians and Surgeons. As Pediatricist to the Cleveland General Hospital, his course of six lectures in the Hospital Training School

THE DENNIS FLUOROMETER.

By JOHN DENNIS, Telegraph Editor of the *Democrat and Chronicle*, Rochester, N. Y.

The object of the Fluorometer, in its use in connection with the Roentgen energy, is to enable the surgeon or physician to ascertain, with exactness, the position which any foreign substance which can be seen on the field of the fluoroscope, occupies in the human body. To accomplish, this it provides:

First—A position of the body or limb, by which what may be called, for want of a more precise term, a perfected



met with such approval that it was decided to publish them in book form.

It is said that carbolic acid, if dissolved in glycerine or alcohol, is not caustic, whatever be the degree of concentration. A small proportion of water added to the alcohol or glycerine solution will cause it to act as a caustic.—*Medical Argus*.

Campho-Phenique, which does not injure human tissue in full strength, and is a better germicide than carbolic acid for surgical purposes, may be used with water or glycerine with perfect impunity.

shadow, on the field of the fluoroscope, or, in the other case, on the sensitive plate, at the same time giving the surgeon data which will enable him to make his measurements not only, but to reproduce the exact position of the body or limb, for purposes of exploration or operation. In other words: it eliminates the element of distortion in the shadow caused by the changing position of the body or limb.

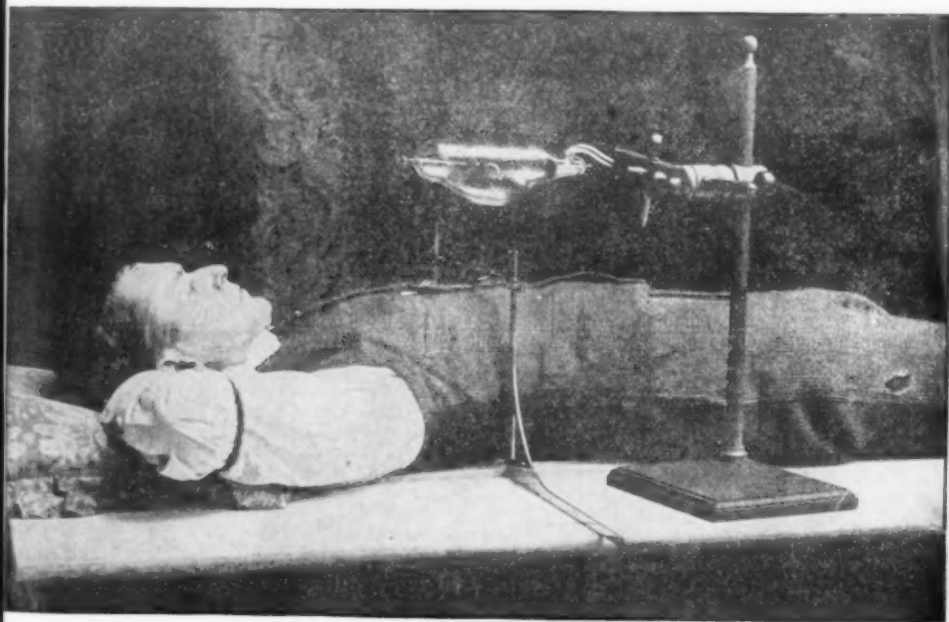
Second—The Fluorometer eliminates the distortion resulting from the radi-

tion of the force or energy known as the X or Roentgen ray.

Third—The distortion caused by the position of the subject and the distortion caused by the radiation of the energy, having been eliminated, the Fluorometer provides an accurate cross-section of the body or limb, and supplies an absolutely correct right-angle, at the intersection of the lines of which the foreign object will be found in the body or limb.

In its last analysis the Fluorometer

cross-section is obtained, the two arms of the Fluorometer will present the characteristic single shadow on the field of the fluoroscope. Attachable to the arms of the Fluorometer are two pins or sights. By means of these sights, the foreign object having been brought in line with them and the proper adjustment having been made, a correct line is produced, with the sights and foreign object coincident. By means of a metallic grating of inch mesh, which is placed adjacent to one side of the body and consequently



consists, essentially, in a set of carefully designed metallic angle pieces, which conform generally to the shape of the body or limb, and which in their use in connection with the x-ray, are susceptible of being squared with a simple and conveniently adjustable table. The patient being laid on the table and a fluorometer appliance adjusted, as shown in the accompanying engraving, the Fluorometer is brought with the body, into the parallelism of the rays. That is, when the proper position of the

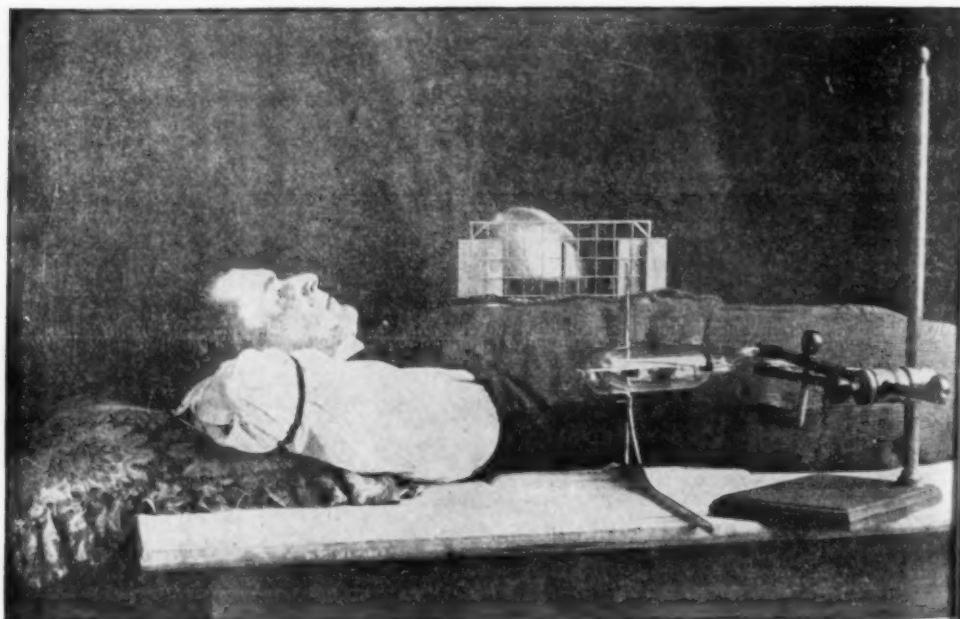
one side of the Fluorometer, exact measurement can be made with the eye from the base line of the Fluorometer and from points on the circumference of the body, to the foreign object. Then, without moving the body or the Fluorometer, the tube is placed directly over the subject for the purpose of obtaining the vertical line. By means of an adjustable cross piece which is placed over the arms of the Fluorometer, exactly the same result in a vertical way is obtained by viewing the subject

from beneath the same condition of muralism having been produced. Another set of pins having been placed in position. It will be seen at once that while the first operation locates the foreign object on an exact cross-section, the second observation shows the exact position occupied by the foreign object in that cross-section. All the elements of distortion having been eliminated, the foreign body will necessarily be at the intersection of the two lines of the right angle.

the fluoroscope, back of the grating, and make the necessary exposure.

IMPROVED ROENTGEN RAY APPARATUS.

The increased demand by the medical profession for Roentgen-ray apparatus, which may be used with ease and certainty, and applied without fear of failure to what are now considered difficult cases, such as fracture of, or dislocation of the hip, has led Messrs. Queen & Co., Philadelphia, Pa., to institute in their



In practice the surgeon indicates the first cross-section obtained by a line of India ink or iodine on the body, and is thus enabled to establish the position of the object by measurements from points on the exterior of the subject, with as much exactness as if the body or limb were actually severed at the first cross-section and presented to view.

If it is desirable to preserve a record of the observations, all that is necessary is to produce a fluorograph by substituting a sensitive plate for the field of

laboratory a series of careful experiments for the improvement of this apparatus in the various parts. One of the most important results of these experiments is the Queen Self-Regulating X-Ray Tube, which has been fully described in previous publications. As further results important improvements have been made in induction coils, vibrators and condensers, and in the complete outfits.

In designing the new line of coils, Messrs. Queen & Co. have given careful attention to proportioning the differ-

ent parts so as to get a very heavy and continuous secondary discharge with the smallest possible amount of wire. As every improperly placed or unnecessary turn of wire in the secondary winding of an induction coil increases its resistance and cuts down the volume of the discharge without proportionately increasing the length of spark, this is a point of very great importance, which has been too often overlooked in coil designing. The distribution of the wire on the secondary was determined by measuring the discharge from single coils

insulating material of the secondary. By this means it is not only impossible for the coils to break down, but small leaks which diminish the efficiency and may develop in time into serious breaks, are entirely prevented.

The induction coil, illustrated in Fig. 1, has neither vibrator nor condenser, being intended for use with an adjustable condenser and independent vibrator, described below.

The spark points are adjusted by the hard rubber disc, shown at the left of the base, which is so well insulated that

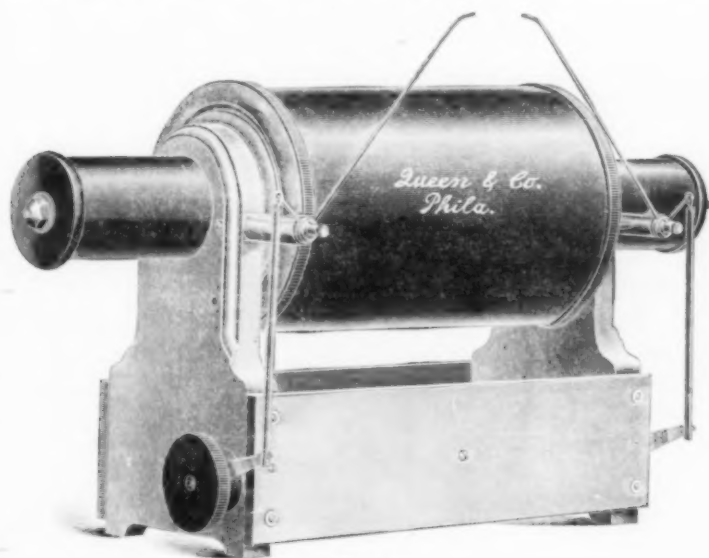


FIG. 1.

of a few turns of wire which were placed at intervals throughout the field of the primary. From the data obtained by these tests curves were platted showing the proper distribution of wire for coils of all sizes.

Similar methods were used to determine the size and number of turns of the primary, and the amount of iron in the core.

In the choice of insulating materials, and in assembling the greatest possible care is used. Methods are employed which remove absolutely all air from the

the operator is in no danger of receiving a shock, even when the points are opened out to the full extent.

The coil is finished throughout in polished mahogany and hard rubber.

The condenser and vibrator for use with coils, illustrated in Fig. 1, are mounted together, and are shown in Fig. 2. Two of the binding posts, shown at the right, are connected to the batteries or lighting circuit, and the other two to the induction coil. The vibrator is operated by means of a small coil (shown at the back of the box) which is a shunt

from the main circuit. An independent set of contacts makes and breaks the circuit through this coil (they are shown in the front of the main contacts), and the switch near the binding post opens and closes the shunt circuit. The main circuit is controlled by the reversing switch, shown at the left.

The vibrator, which is a very much improved form, is shown more in detail

arrangement is the suddenness of the "break," which is accomplished by the collar in the vibrator spring striking the moveable contact while at full speed. In the old forms of interrupters, the break was made when the vibrator started to move, consequently it was not only much slower, but did not make use of the momentum of the iron head of the vibrator. Sometimes the welding action

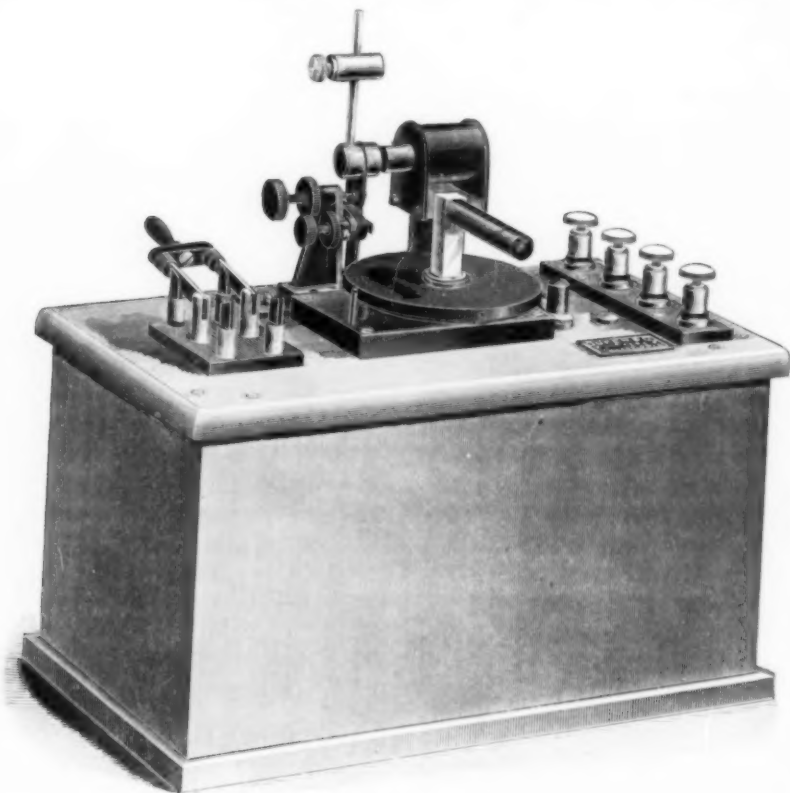


FIG. 2.

in Fig. 3. The moveable platinum contact is carried on a small vertical spring behind the vibrator spring. When the contact is made the movement of the vibrator is not arrested, as in other forms but continues to its full amplitude, thus allowing a long "make." The length of the "make" can be varied by screwing in or out the other platinum contact. The most important advantage of this

of the current joined the two pieces of platinum so tightly that the magnetic pull was not sufficient to separate them. In the new form, as the break is made when the vibrator is at the middle of its swing, the sudden blow with the entire momentum of the vibrator head is always sufficient to break the platinums apart, and once started, the vibrator continues in motion until the current is

turned off. The suddenness of the break makes it possible to use this form with an adjustable condenser, and independent vibrator mounted on the same

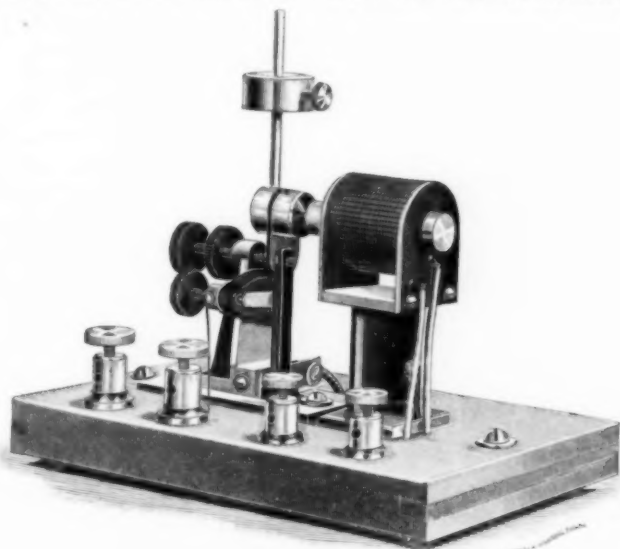


FIG. 3.

of vibrator on the 110 volt, as well as battery circuits; it also adds very greatly to the efficiency of the induction coil with which it is used.

A rod screwed into the iron head carries a weight which may be moved up and down and clamped in any position with a set screw. By this means the rate of vibration may be varied within wide limits. To summarize, the new vibrator has the following advantages over older forms:

First. Its action is independent of the current going through the coil.

Second. Its rate of vibration is adjustable.

Third. It permits of a long "make," and the length of the "make" and "break" are adjustable.

Fourth. The "break" is very sudden, increasing the efficiency of the coils and making it thoroughly adapted to the 110 volt circuit.

Fifth. It never sticks.

The outfits, complete for x-ray work, consist of a coil mounted on a base, with rheostat if used for 110 volt circuit, and

base, as illustrated in Fig. 4. In addition to this, a number of tubes, suitable stand, fluoroscopes, etc., are included with each set.

In making up these outfits Messrs. Queen & Co. have aimed to combine the apparatus in such a way as to secure ease and certainty of operation, and at the same time powerful results.



FIG. 4.

BEYOND.

BY MRS. ELLEN KNIGHT BRADFORD.

[Written for the AMERICAN X-RAY JOURNAL.]

With vision clearer than e'en tears could make
 The eyes whose limit was the violet ray,
 We now may see, and things which lie beyond—
 (Life's mysteries long screened) are ours
 to-day!

Yea, now we see! Blest be these mortal eyes!
 The veil is pierced! How like magician's
 sleight

This bringing of life's marvels to adjust
 Within the focus of our second sight.

And if our waiting eyes are made to see
 New visions, then perchance our ears may
 hear

New sounds; each sense be quickened, till at
 last

All nature's secrets grow divinely clear!

What if our ears might catch the gentle tread
 Of the Spring's coming—hear the sparkling
 dew

Sprinkle the lily's cup, and thro' the mold,
 List the procession of the violets, blue!

If we might hear the crocus part the sod,
 And come with merry face to meet the
 light,

Or learn the symphonies of the pulsing stars,
 That breathe the benediction of the night!

Then soon, with quick perception we might find
 Heaven all about us. Ah, so let it be;

That with these human senses made divine,
 We may put on our immortality!

MOLINE, ILL., June 30, 1897.

The American X-Ray Journal Pub. Co.
St. Louis, Mo.

GENTLEMEN: I will take the liberty of reporting to you what is to me at least a novel and interesting surgical manipulation, and to my knowledge the only one of its kind on record.

The 15th day of June, 1897, a boy, apparently about five years old, accompanied by his father, called at my office. The boy was fair-sized, rather emaciated, large deep set eyes, a little nervous, complained of a pain after eating, with two or three small hemorrhages the past three weeks, with a somewhat profuse

hemorrhage the day preceding their call at the office.

Father also stated that the boy had lost his appetite—in fact, was afraid to eat from the pain that it caused him after eating. Father stated that 17 months previous the boy had swallowed a book case key during an attack of coughing. That he had consulted a number of physicians, and they advised him to let it alone while it did not inconvenience the child. For a period of a little over twelve months little or no trouble was experienced from the presence of the foreign body in the stomach.

I, without asking any more questions, applied the fluoroscope, readily outlining the key. Not being prepared as to what course of treatment to pursue, I dated my next call June 19th. In the meantime I looked over my case pretty thoroughly. The novel idea struck me that could I procure a forceps that I could introduce from the mouth into the stomach, and thus by the aid of the x-ray extricate the key, that it would, if possible, be of least danger to my patient and most convenient for myself.

I therefore got a forceps in spiral form, made to remove foreign bodies from the esophagus, manufactured by Sharp & Smith. With this at hand, I waited for the arrival of my patient. Having given instructions not to give him any dinner or supper, I proceeded at once to give him an anæsthetic. Placing the fluoroscope over the region of the stomach, I introduced my forceps, to find that it was from two to three inches too short. Having my little patient on a Clark & Roberts operating table. I simply turned this contrivance in an inclined position, head down. This brought the key in reach of the forceps. After manipulating the forceps in the stomach for some little time, I found it difficult to bring the forceps and key in contact, as I had no control whatever of the forceps. I therefore placed

my hand on the abdomen in the region of the stomach. By making deep pressure in one position or another, I could readily move the key. The forceps being more stationary, I worked the key into the forceps, as it were, but the angle did not seem to be right. I used all the force that I thought prudent. The third or fourth time I did not grip the key quite so hard, when it slightly changed its position in the active extraction, immediately after which quite a profuse hemorrhage occurred. I changed the position of the lad that the blood might not enter the trachea, and awaited his recovery from the anæsthetic, which I promoted by artificial respiration.

When he was able to swallow I gave him small pieces of ice; gave him a rather strong solution of chloride of iron, upon which all bleeding ceased.

He was taken to his home. The next morning he found it difficult or almost impossible to swallow liquids, but could with very little inconvenience swallow semi-solids, he was, therefore, given milk or water toast. Experienced very little pain; vomited considerable blood day after the operation—none since. When last I heard from him he felt well in every particular, with the exception of the difficulty in swallowing liquids, in which he was improving from day to day.

The key, which was about three inches long, was so corroded that the handle part was no thicker than a sheet of paper. The tongue of the key was so nearly rusted off that it was broken a day or so after on the slightest pressure. On that part which had fitted over the pin in the lock, the action of the acid in the stomach had access to that part of the key, both on the inside and out, was so corroded that in two or three places the circle had been destroyed, making sharp and ragged edges. Had this key remained, it would, without question, have killed the child, either

from the loss of blood or inanition or inflammation, as the sharp points would only have been increased in number.

The accompanying picture is a photograph of the end of forceps and key. I am at present getting up a forceps with a little screw on the handle, so that I can turn forceps at any angle at will while in the stomach, and about six inches longer. Armed with this instrument and the L. E. Knott high frequency induction coil, with their improved Crooks tubes, I defy any metallic substance to remain in the stomach if I have opportunity to remove same.

Yours truly, A. H. ARP, M. D.

CAMPHO-PHENIQUE IN THE TREATMENT OF SEVERE BURNS.

By FRANK L. JAMES, Ph., D. M. D., ST. LOUIS, MO.

The results in the following case, which I am now asked to write up after the lapse of several years, were so remarkable that I would scarcely venture to put them on paper, were not other physicians who saw the case yet alive and willing to corroborate what I have to say:—

W. L. C., single, about 20 years old, white, a waiter at a cheap restaurant, was one day, some ten years ago, assisting the cook to remove from a high range, a large tin boiler full of boiling green corn. A brick, that he had stepped on, to get a better hold on the can, turned as he lifted his side of the latter, and he fell, the can being turned over at the moment, and nearly its contents thrown over him. A bucket full of cold water was thrown over him and he started for my office on a run. When he arrived at the door, seeing a little girl in the operating chair and a lady standing by, so great was his nerve, and the innate politeness of the man, that he stopped at the entrance for a moment.

I saw that something unusual had happened, and turned to ask him what

was the matter. He replied in a steady voice: "I am scalded, badly scalded, sir!"

The child jumped out of the chair, and the lady bade him come in, and at once took her departure.

On attempting to remove the undershirt, large pieces of skin, some of them of an area equal to the palm of the hand came off with it. His right arm and shoulder were nearly peeled; there was a burn across the chest extending from nipple to nipple, from which the skin hung in tatters, and there was a strip of parboiled skin extending from the hip to the knee of the right leg. The left side of the body had not suffered to the same extent, but it had not escaped entirely. There were several severe burns on the forearm and wrist, and on the buttock of that side. Altogether it was the worst scald that I had ever seen in my practice of then nearly twenty years.

I was at the time experimenting with an article that had not yet been put upon the market (Campho-Phenique) and had found that it promptly relieved the pain of minor burns; so without stopping to think of the danger of phenol absorption, etc., I poured about two ounces of it into a bowl and emptied about twice that much salad oil in with it and with the mixture commenced to swab the burns. In the course of two or three minutes the poor fellow began to say: "Oh don't that feel good! Don't that feel good!" Repeating the words over and over again.

I had scarcely made the application before doubts and fears began to crowd into my mind—fears of carbolic acid poisoning (by absorption) being uppermost. After I had avoured the wounds I dusted over them plentifully some corn starch powder that I chanced to have by me, and started to ring for a conveyance to carry the patient to his rooms, two or three blocks away. He

declared that he felt strong enough to walk, and that he could not afford a carriage; so throwing over him a linen duster, he was permitted to go to his room.

This was about noon, and about 7 o'clock p. m., still fearing an accident on account of the large amount of phenol contained in the agent employed (I was then only experimentally acquainted with Campho-Phenique) I went to the patient's room to see him.

I found him *sitting up, reading*, and inquiry developed that he had slept a couple of hours during the afternoon. As the man was comfortable, nothing further was done that evening except to prescribe a saline aperient to be taken early next morning.

The next morning I received a note requesting me to visit the patient—"at my leisure, sometime during the morning, as he was feeling too sore to walk down" (to use the words of his note). I did so, found him without a fever and he reported that he had slept the better part of the night. I opened some large blisters, emptied them and dusted the surface with starch, after having applied Campho-Phenique, and left the patient comfortable.

That afternoon an accident (a slip upon the stair) compelled me to keep the house for several days. In the emergency I sent for Dr. Joe Leslie, now of Hot Springs, Ark., who took charge of C.'s case, after I had explained the situation to him.

Dr. Leslie treated the case on the lines that I had commenced, using no dressing but Campho-Phenique and starch powder, and a few days later the patient called on me and asked if I thought he could go to work.

Most of the wounds had healed completely, but there was still a bad sore on the chest and another on the knee (I've forgotten on which side) which were several days (possibly a couple of

weeks) longer in healing. There were no bad scars, and needless to say no trace at any time of phenol poisoning.

Since that time, and up to my retirement from active practice, some five years ago, I have frequently used Campho-Phenique in burns and scalds, and always with the same results—rapid alleviation of pain, and rapid resolution.

I have related the experience as the events occur to my memory, after so long a lapse of time, and while I may have forgotten some points, the statement is essentially true in all respects. I consider that the entire Materia Medica contains no agent superior to, or the equal of Campho-Phenique in burns of every degree.

FRANK L. JAMES, M. D.,
615 Locust St., St. Louis, Mo.

Extract from a letter received from Dr. Bowman E. Pearse, Editor Kansas Medical Index, and a prominent practitioner of that city, July 16th, 1897, says:

Campho-Phenique, Campho-Phenique Powder and Campho-Phenique Gauge are always on my dressing table at my clinic room; always in my cabinet at my private office, and always in my satchel for outside work. The reason for this, if asked, is simply because they do their work well, and constitute an ideal dressing outfit.

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